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Dec. 4, 1926

Science News-Letter
The Weekly Summary of Current Science
Edited By Watson Davis

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MEDICINE

Tuberculosis Vaccine for Monkeys and Babies

By Marjorie MacDill

Will the next generation of school children have to present certificates of vaccination for tuberculosis as well as for smallpox? Will the great drop the white plague death rate has taken in the last twenty years, be still further accelerated by artificial immunity acquired through vaccination?

That these contingencies are within the range of probability is indicated by the fact that thousands of babies born in tubercular homes in the slums of Paris have had their chance of survival augmented 25 per cent. by inoculation with tuberculosis vaccine, according to reports from the Pasteur Institute.

Medical men in years past have dreamed of producing a strain of tubercle bacilli so weakened that its power to provoke virulent symptoms would be lost but which would still be able to confer power to resist the disease. Prof. Albert Calmette of the Pasteur Institute in Paris believes that he has achieved such a substance in his famous vaccine, BCG.

BCG is a kind of half-starved strain of tuberculosis germs that have been grown for many years in test tubes on the unappetizing diet of beef bile. Somewhere in the succeeding generations raised in this state of semi-starvation the bacilli have lost their disease-producing powers and yet retain a certain amount of their capacity to call forth disease-resisting antibodies when injected into the human system.

First Prof. Calmette and his associates tried out their new vaccine on laboratory animals including monkeys. Monkeys are naturally the most logical animals to work with in experimentation of this kind because they are man's closest relatives from the point of view of physiology. Unfortunately, Paris is so rife with tuberculosis that the chimpanzees and other of the higher types of monkeys that live habitually only in the tropics, were perpetually succumbing to naturally acquired intercurrent infections.

In order to know just what the vaccine could do in the way of prevention and protection, it was absolutely necessary that the diseases to which the monkeys were subjected be under control of the experimenters.

Tropical monkeys, however, do not take kindly to civilization or to a cold climate and will die off at the slightest provocation. Prof. Calmette decided that to attain really accurate results it would be necessary to transfer the scene of simian activities in tuberculosis to the jungle regions whence they came. Through the cooperation of the governor general of French West Africa a park-like section of land at Kindia in French Guinea was acquired for the Pasteur Institute as a site for a laboratory of animal experimentation.

Such a laboratory was accordingly built and fitted up for work with the "chimps" and higher apes under the best conditions of their native environment. Since 1924 whole families of monkeys have been bred and reared under the most hygienic circumstances in all other respects as much like their native haunts as possible. Medical experts administer vaccines and serums to protect them against pneumonia and the common diseases that are current among animals in central Africa. Natives collect their customary foods for them from the jungle and scientists watch their intellectual development. In short no effort is spared to make their days on earth happy and every member of the monkey

(*Just turn the page*)

DESSERT IS SERVED. Will the gentlemen have coconut a la mode, or perhaps date souffle?

Tuberculosis Vaccine

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colony is supervised as carefully as the children in an up-to-date experimental school.

The results thus far have been most gratifying and few animals have died from infection from outside sources. Dr. J. Wilbert on the staff of the Kindia branch of the Pasteur Institute declares that the chimpanzees are uninjured by Prof. Calmette's anti-tuberculosis vaccine and that they fail to contract the disease when placed in isolation with other "patients" in its advanced stages. The immunity conferred by the vaccine, he states, lasts over a year, and can be renewed by fresh doses.

Incidentally, according to a statement recently issued by Prof. Calmette, the Kindia monkeys will be used in experiments to determine the causes and treatment of all the diseases against which man is not yet effectively armed, as well as in tuberculosis investigations. Indeed, the Kindia laboratory furnishes unrivaled facilities both for the psychologist to observe the family life of chimpanzees at close range and for the physiologist to study the mechanism of their interiors.

In the meantime Prof. Calmette after careful experimentation with other animals, felt that he had sufficient basis to justify carrying out vaccinations on babies born in the slum districts of Paris where tuberculosis in the family made infection of the new born infants almost inevitable. The results were encouraging and many babies in poor families, particularly those with tubercular mothers, have been treated in Paris and other big industrial cities in France.

Records kept by Prof. Calmette and his associates indicate that less than one in a hundred of the inoculated babies died before they were a year old in spite of living in families in which were one and sometimes more members in severe stages of the disease. Children of the same age as those in the inoculated groups and living in the same sort of bad surroundings were left untreated and held under observation as controls. It was found that as many as twenty-five in every hundred such groups contracted tuberculosis and died before they reached the twelfth month.

It must be distinctly understood that BCG is not a cure for tuber-

(*Continued on Page* 151)

STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

GENERAL SCIENCE

Now is Your Chance to Photograph Meteors, p. 149. Buddhist Art Like Greek, p. 147. Oldest Maya Ruin, p. 155. An Unsolved Cipher, p. 157. Anniversaries of Science, p. 159. Articles marked with * in classification below.

BIOLOGY

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HYGIENE

Tuberculosis Vaccine for Monkeys and Babies,* p. 145. The Menace of CO,* p. 155.

CHEMISTRY

Fluid Fuel, p. 147. The Menace of CO,* p. 155.

PHYSICS

Measure Magnetism of Atom, p. 155.

(This will fit on a 3 x 5 card.)

Science News-Letter, December 4, 1926

News-Letter Features

Born over four years ago, on March 13, 1922, of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the SCIENCE NEWS-LETTER has since proved interesting to laymen, scientists, students, teachers and children.

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Books are *reviewed in brief* as they are received from the publishers.

The classics of science and striking passages from current books, addresses and periodicals are carefully selected and published.

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Regular articles tell of the happenings in the *skies* and in the great *outdoors*.

Photographs aid in the telling of the week's science.

Science News-Letter, December 4, 1926

The new heading on the first page of this issue has incorporated in it representations of two of the plaques that decorate the building of the National Academy of Sciences and the National Research Council in Washington, in which the offices of Science Service are located. The one on the left represents "Light" and the one on the right "Darkness."

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Fluid Fuel

By Edwin E. Slosson

The mobility of man is measured by the mobility of the power he employs. Consequently, the efforts of technologists are now directed toward increasing the fluidity of fossil fuel. The finer the particles the more fluid the form. The cheapest and most abundant source of energy is coal but this is solid and deeply embedded in the rocky matrix of the earth's crust. From this matrix the coal has to be torn loose by explosives and then broken into lumps small enough to be shippable and shovelable. Putting fuel into powdered form it can be blown into a furnace on a blast of air. By combining it with hydrogen we can reduce the carbon to a liquid form and by heat convert it into a gaseous state where all the molecules are free and independent. Fuel in this free and fluid form, like gasoline and Diesel oil, has given us the internal combustion engines and made possible the automobile, the airplane and the submarine.

But the atom is not the limit of divisibility, although that is what its name implies. As we now know, it is possible to break up the atom, and its finer fragments, electrons and protons, afford us a still more fluid form of energy, the electrical current. To transport solid coal from the mine to the factory requires a large part of its power. To transport water from the mountain to sea requires no power. It will flow down hill of its own accord if you will only provide it with a sloping channel or an empty pipe. To transport electricity from a point of high potential to a point of low potential requires no power. The current will flow down hill of its own accord if you will only provide it with what is for it an empty pipe, that is, a copper wire. And the electric current will travel far faster than the coal train or the flowing stream. So the efforts of inventors are now concentrated on methods of increasing the mobility of energy by such means as converting coal into a liquid form, or converting its energy into the electrical fluid.

The transmission of power by wire is in actual operation up to two hundred miles. The wireless transmission by ether waves travelling at the rate of 186,284 miles a second is a vision of the future. Since such a speed is virtually instantaneous for all points on the globe the limit of mobility is here attained.

Science News-Letter, December 4, 1926

NOT A GREEK STATUE OF VICTORY, but a Buddhist saint found in Chinese Turkestan. This photograph, taken by Dr. von Le Coq, illustrates how Greek standards of art reached this remote region.

Buddhist Art Like Greek

Kinship of the calm, slant-eyed Buddhas of eastern art to the virile sculpture of old Greece has been proved by statues and paintings found in Chinese Turkestan. This is the conclusion reached by the well-known Berlin ethnologist, Dr. Albert von Le Coq, which he explains in *Art and Archæology*, the journal of the Archæological Society of Washington.

Many art exhibits brought to Berlin from the Turkestan expedition by Dr. von Le Coq and his associates have been carefully studied, and he states that there is proof that Buddhistic art of India, Java, China, Korea, and Japan has risen upon a common foundation, which is ancient Greek. Examples of Greek art worked their way gradually eastward in Turkestan, affecting the work of local artists; and as time went on, Chinese art influences swept in from the east, changing the Buddhas and giving them their well known oriental aspect.

One impressive piece of evidence, cited by Dr. von Le Coq, is a headless statue of a Bodhisatva, or Buddhist saint, which resembles very closely the Greek statues of Victory. Since Buddhist paintings had become so thoroughly Chinese, the scientists who found the saint's statue were puzzled to know why Buddhist sculpture should have kept the alert, vibrant look of Greek figures.

Later excavations revealed the workshops of a monastery, where a great number of plaster moulds were found, showing that the artists had turned out their religious statuary in an efficient and simple manner. The moulds were sturdy enough for long service, and could be easily replaced. With this clue, the ethnologists found that the ancient type was represented endlessly until in later times, the tenth century, the moulds were deliberately changed to suit the changing ideal of beauty. Middle Asia was by this time cut off from the western world and its influence, while the roads from the East were always open.

The ruins in this inaccessible region which yielded the wall paintings and statues were of two types, Dr. von Le Coq explains: first, the temples in cities, and, second, cave-temples cut into the perpendicular faces of rock in wild, remote glens.

One extensive settlement of temples cut into steep cliffs is described. The temples were half full of loess dust, a peculiar drifting soil of Asia.

"On removing this," he says, "the pictures on the walls became visible, and on the floors we found heaps of manuscripts, heads and torsi of statues, coins, moulds, stencils in paper, seals, temple flags, etc. All these things had been snatched down and savagely trodden under foot. Still, even though damaged, they are most interesting relics of a wonderfully advanced civilization."

Among the most important material which the scientists brought back to Berlin from the old city of Khocho are a great number of manuscripts in seventeen different languages. The writings in Greek, Persian, Sanskrit, Middle Turkish, Chinese, Tibetan and other languages are evidence that this remote region was in early times a junction point where many different peoples brought contributions of learning. The manuscripts include writings in the lost language of the White Huns and others in two unknown languages in undeciphered alphabets.

Science News-Letter, December 4, 1926

Roman tribes in Europe built houses of stone, whereas Germanic tribes preferred wooden structures.

A Brazilian rubber tree, which is supposed to be a delicate tropical plant, has been growing at Palm Beach, Florida, for 25 years.

Ventriloquism, or the practice of making the voice appear to come from a distant point, is believed to have played an important part in magic and ceremonial rites of many peoples.

Science Service Books

In cooperation with leading book publishers, Science Service has taken part in editing the following books on science:

CHATS ON SCIENCE. By Edwin E. Slosson. New York: The Century Company. 1924. $2.00.

SCIENCE REMAKING THE WORLD. Edited by Otis W. Caldwell and Edwin E. Slosson. New York: Doubleday, Page & Co. 1923. $2.50 and $1.00.

KEEPING UP WITH SCIENCE. Edited by Edwin E. Slosson. New York: Harcourt, Brace & Co. 1924. $2.50.

WHY THE WEATHER? By C. F. Brooks. New York: Harcourt, Brace & Company. 1924. $2.00.

SOIL AND CIVILIZATION. By Milton Whitney. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. $3.00.

ANIMALS OF LAND AND SEA. By Austin Clark. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. $3.00.

THE EARTH AND THE STARS. By C. G. Abbot. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. $3.00.

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FOUNDATIONS OF THE UNIVERSE. By M. Luckiesh. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. $3.00.

CHEMISTRY IN MODERN LIFE. By Svante Arrhenius, translated and revised by C. S. Leonard. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. $3.00.

CHEMISTRY IN THE WORLD'S WORK. By H. E. Howe. Library of Modern Sciences. New York: D. Van Nostrand Co. 1926. $3.00.

EVERYDAY MYSTERIES. By Charles Greeley Abbot. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. $2.00.

DWELLERS OF THE SEA AND SHORE. By William Crowder. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. $2.25.

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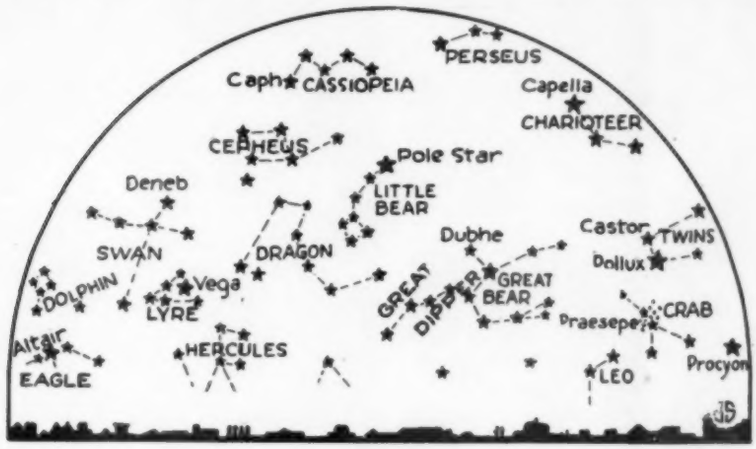
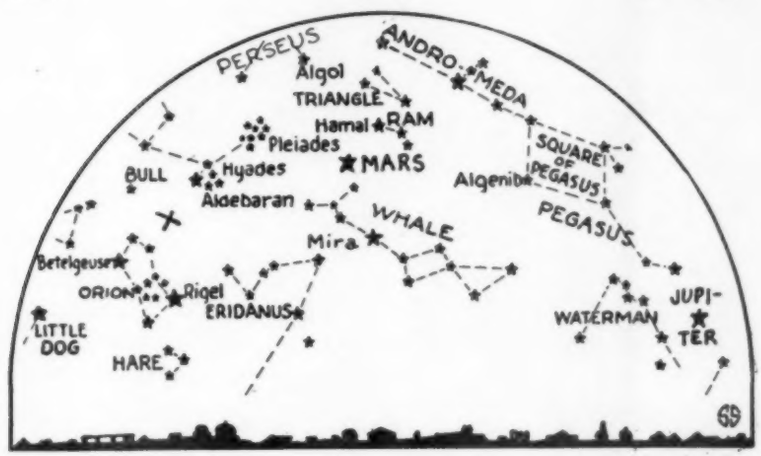
Now is Your Chance to Photograph Meteors





Hold this map in front of you and face north or south. The upper or lower map (depending on which way you face) shows the sky as it appears at 8.30 p. m., local time, on December 1, at 7.30 p. m. on the 15th or at 6.30 p. m. on the 31st. The cross on the lower map near the Bull shows the place to point your camera in order to photograph the Geminid meteors on December 10 to 13.

By James Stokley

With the coming of December there comes the best opportunity for the amateur star gazer who is also a photographer to combine his hobbies for the purpose of making meteor photographs, which will not only be of interest to him, but may even be of scientific value to astronomers. This can be done during the meteor shower that occurs about December 10 to 13, known to astronomers as the Geminids, because they seem to come from a point in the constellation of Gemini, the twins.

The Geminid meteors are not as bright as some other showers, when seen with the eye, but they seem to affect the photographic plate more. At the Harvard College Observatory, in Cambridge, Mass., where the skies are photographed every clear night, many meteors have been recorded. Dr. Willard J. Fisher has been searching over the old files of negatives of the heavens, and has found 281 meteor trails already, but only the Geminids pile up on any one plate. The rest are scattered among various other showers.

Unfortunately, December 10 to 13 is apt to be a time of cloudy weather, and as not even the best telescope can see through the clouds, bad weather has made it impossible to obtain photographs in a number of years. And again, when it is clear, and the moon is full, there is a general illumination of the entire sky which hinders the observer, because long photographic exposures cannot be made without fogging the plates.

This month, however, the moon will be practically out of the way, for it will be at first quarter on the twelfth, which means that it sets at midnight, so that late in the evening the meteors may be photographed, if weather permits. As it may be clear in one part of the country when it is cloudy elsewhere, Dr. Fisher requests that as many people as possible attempt the photography of the meteors, on any of these nights, from the 10th to 12th.

"For this purpose," says Dr. Fisher, "fast lenses are recommended; lenses slower than f.6 (about the speed of a good "anastigmat" lens) may have luck, but the prospects of success diminish rapidly with small stops. The meteors are not frequent early in the night, and no one is urged to begin before 10 or 11 p. m., local time. Most observers should point their cameras at some definite altitude and fix them there. Exactly overhead, at the zenith, is the most convenient, though the Harvard Geminid trails have been caught mostly between Taurus and Orion. (This point is indicated by a cross in the accompanying map.)

"The camera should be firmly fixed, so as not to be shaken by the wind. The diaphragm should be opened wide, and the focusing should be careful. Set the shutter on T ("Time"), and open at a moment noted by the watch, which should be recorded immediately. Let the exposure go on for an hour, then close the shutter, noting the time; change the plate or film, open at a noted moment, expose for an hour, close at a noted moment, and so on until dawn."

Even if you are not enthusiastic enough to continue this until dawn, as Dr. Fisher suggests, you might at least try it for one or two hours, and you may catch something. Develop the films or plates, or have them developed, in the ordinary manner, and then examine them for curved trails made by stars, or straight trails made by meteors. "If you send the developed films or plates to the Harvard Observatory," says Dr. Fisher, "they will be carefully searched. Address 'Meteors, Harvard College Observatory, Cambridge, Mass.,' and send a letter stating the place where the exposures were made, the region of the sky aimed at, and the time of opening and closing the shutter for each negative." In this way, you may help astronomers learn something more about these fiery bullets that are continually being shot at the earth from outer space.

An interesting object now visible can be seen in the southern sky. That is Mira, "The Wonderful," known sci-

(*Just turn the page*)

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Photographing Meteors

(*Continued from Page* 149)

entifically as Omicron Ceti, in the constellation of Cetus, the whale, shown on the accompanying map. If we watch this star regularly, we will find out why it is called "The Wonderful." In August, 1596, an amateur astronomer by the name of Fabricius saw in Cetus a star that he had not noticed before, but it soon faded from view. He supposed that it was a nova, a "new star" such as occasionally flashes out from previous obscurity. Though it did reappear, unlike a nova, it was not until many years later, as a result of observations made between 1648 and 1662, that the Polish astronomer Hevelius solved the mystery, and showed that the star was a variable—one that more or less regularly becomes alternately bright and faint. Since that time many variable stars have been discovered and are regularly watched by a large band of amateur astronomers, but Mira remains perhaps the most famous.

When near its maximum brightness, which occurred in November, Mira can be seen with the unaided eye, but when it is at the minimum, it can only be seen with a large telescope, for then it is of the tenth magnitude, far beyond the reach of even the keenest eye. Next May, when, however, it will be too near the sun to be seen anyhow, it will be at minimum, and then next October, eleven months after the last maximum, it will be at maximum, again. As the period in which it varies is about a month shorter than a year, about every decade the times of greatest brightness occur when it is too near the sun to be seen, and the minima occur when it is in a more favorable position. As a result, several years at a time will go by, during which it is never visible except through a large telescope.

Among the planets, Mars is still prominent in the evening sky, while Jupiter can be seen low in the west. On the fifteenth, Mars is directly south at 8:34 p. m., local time. It has already receded considerably from the earth since it was closest in October, for on this date it is 60,920,000 miles from us. But it is still well placed for observation, and astronomers are now busy watching it, as they will for many months.

On December 22 at 9:34 a. m., eastern standard time, is the winter solstice, when the sun enters the zodiacal sign of Capricornus, and winter officially commences.

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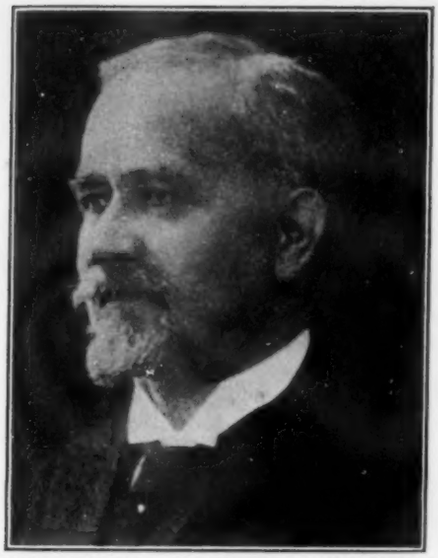

PROF. ALBERT CALMETTE of the Pasteur Institute whose anti-tuberculosis vaccine has helped thousands of French babies to withstand the TB of Paris slums.

Tuberculosis Vaccine

(*Continued from Page* 146)

culosis but the work at the Pasteur Institute indicates that vaccinated individuals may be protected by it for a certain length of time even though in close contact with severe cases. Physicians in other countries in Europe and in French colonies in Africa and Asia are cooperating with the Pasteur people. At the end of June, 1926, over 11,000 babies of many nationalities and colors had been treated with the new vaccine. It is usually administered by mouth and is given only to new-born babies when they are but a few hours old so that their opportunities to become infected will be reduced as much as possible.

Prof. Calmette maintains that the membranes of the intestines are more permeable during the first two weeks of life than they are at any other period. Consequently it is argued the vaccine administered at this time gets into the general circulation more quickly than would be possible later.

The French scientist's unfortunate experiences with monkeys in tuberculosis work at Paris has led to the establishment of one of the most unique buildings in any modern metropolis, not even excepting the model zoos of New York, London and Berlin. It is, in fact, a monkey house with all modern improvements, that supplies every simian comfort possible in a chilly northern climate. This comfortable structure of glass and concrete stands in the grounds of the Pasteur Institute at Paris and was made possible through a gift from Princess Marie of Greece, who has dedicated it to the memory of her father, Prince Roland Bonaparte, himself a patron of scientific endeavor.

Prof. Calmette believes that in order to preserve in an alien and civilized region the animals that are an essential requirement of nearly every task of medical research, their living conditions should approximate as closely as possible their natural habitat. He has made a careful study of simian needs and peanuts and bananas, circuses and zoos notwithstanding, are not the only things they should have to eat in his estimation.

Two big blacks from central Africa where the Pasteur monkeys were collected, act as cook and valet de chambre. One burly African in the model kitchen at one end of the glass enclosed building prepares menus as well balanced as any self-respecting chimpanzee would steal for himself in the depths of the Kongo.

Each ape has a roomy chamber enclosed completely with glass or screen, as the weather requires, except for a small window in front. Radiators located midway up the wall keep the atmosphere at suitable temperatures, while an elaborate ventilating system, running water and a system of perches and swings that would do credit to any playground help to make urban home life an attractive substitute for a precarious struggle for existence in central African wilds.

Right now the occupants of the monkey house are contributing their bit to the Pasteur Institute's attack on cancer. From time to time the glass walled dwelling in the grounds on the Rue Dutot will serve as a source of supply for work on other diseases but for the present the experimental side of tuberculosis work is being concentrated at Kindia.

What further developments in immunity to the dreaded plague of civilization will arise from work in the jungle laboratory only time can tell. Whether practical vaccination of adults to prevent the onset of the white plague is possible or not lies on the knees of the gods, or more practically, in the test tubes of the research men. Tuberculosis authorities in this country are inclined to be skeptical. It seems to be the general concensus of medical opinion here that the introduction of living tuberculosis germs, no matter how weakened, into the system is fraught with danger because experience has shown that any strain of tuberculosis bacilli may become virulent. Much more conclusive experiments with animals, it is felt, will be necessary before American babies should be allowed to be inoculated with a vaccine of this type.

Science News-Letter, December 4, 1926

Portable time pieces have been used for 400 years.

The Monarch butterfly migrates all the way from Florida to the Arctic zone.

Animals that live on vegetation fatten during the summer in preparation for cold weather, when plant food will be scarce.

A white elephant formed part of the retinue attached to the "Temple of the Tooth" at Anarajapoora, in Ceylon, about 500 B. C.

THE MODEL MONKEY HOUSE built to enable the "chimps" to survive infection from the diseases of civilization. The apartment of their caretakers is at the far end.

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BIOLOGY

Always Starting Something

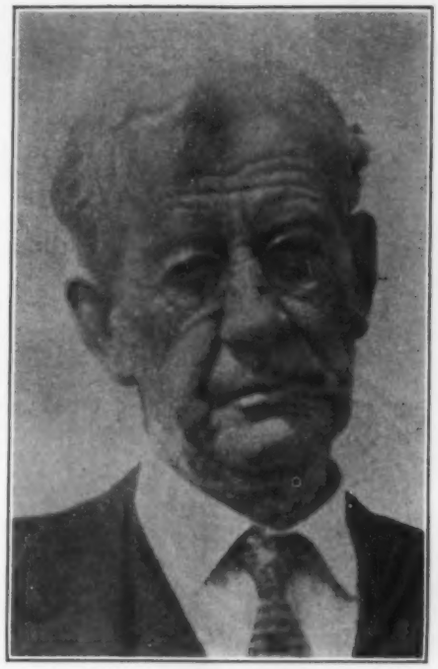
A habitual starter of scientific institutions and enterprises, would serve very well as an informal characterization of Doctor Ritter, who has just celebrated his seventieth birthday. He began his career of starting things thirty-five or forty years ago, when he left his native state of Wisconsin to study under the famous elder Le Conte at the then new University of California. Professor LeConte held the "settee" of natural history at the University, and Ritter, becoming interested in the biological end of that capacious piece of academic furniture, sawed it off and set it up as the first chair of zoology on the Pacific coast.

Ambitious attempts to start a marine biological station, mostly without funds, attracted the attention and interest of men outside his own field and indeed outside all formal science. Most notable among these was one of the most successful newspaper men in the world, E. W. Scripps. The two developed that most inseparable of all companionships, a mutual mind, and therefrom grew the first of their common undertakings, the Scripps Institution for Biological Research at La Jolla, now the Scripps Institution for Oceanography. Though Doctor Ritter had contemplated the change in emphasis and title of the institution, it was not made until he was ready to hand over its active charge to his successor, Dr. T. Wayland Vaughan.

Following the War, the restless mind of Mr. Scripps dwelt much on the necessity for informing the general public in authentic but assimilable science; and Doctor Ritter officiated at the birth of a third institution, Science Service. It will probably never be settled which of the two is entitled to priority in the Science Service idea, for to the day of his death Scripps insisted it was Ritter, and Ritter still insists it was Scripps.

Another problem that engaged the attention of this philosophical-executive team was the march of the Malthusian ghost, and the outcome has been the founding, at Miami University, of an institute for the study of population problems.

The fifth, and so far the final, major undertaking of Doctor Ritter is a nursery school back in the beloved State of his adoption, and under the immediate direction of Dr. Watson Bailey, one of his former students at the University of California. This is to be a "psycho-biological" institution, where not only the children will be taught by their teachers, but also the teachers will be taught by the children. For it is one of Doctor Ritter's observations that, with all the attention that has been paid to curriculum in schools of all grades, curiously little effort has been made to instruct ourselves in the nature of the small human organisms we are striving to stimulate. So this school will be an instrument for reciprocal learning.



WILLIAM EMERSON RITTER

However, the establishment of five scientific foundations has not been sufficient to take up all of Doctor Ritter's time. He has filled in chinks with occupations that might serve as *opera magna* for lesser men, such as putting a state academy of science on its feet and establishing and running a most scholarly series of university publications. Thereto must be added his indefatigable researches on the colonial tunicates of the Pacific littoral, his earlier heavy teaching schedule, and latterly his bio-philosophical writings.

The latter are an expression of a scientific and life outlook from which all his varied enterprises have taken form and color, and on which, as on a central cord, they have been unified and coordinated. When the high tide of mechanistic doctrine in biology went over the world, Doctor Ritter remained stiffnecked and unconverted, adhering to the old faith of a "natural history approach," and now he has the satisfaction of seeing many of the second generation of mechanists softening their dogmas, and in such pilgrims' disguises as "physiological ecologists" returning to the old shrines.

A great many present-day biologists have no patience at all for scientific methodology, but for those that have stomachs for such meat the philosophical works of Ritter offer opportunity for chewing, without exposing them to the danger of foundering on windy metaphysics.

Science News-Letter, December 4, 1926

BIOLOGY

A Birthday Dinner

Dr. William E. Ritter, President of Science Service, former director of the Scripps Institution for Oceanography at La Jolla, California, and emeritus professor of zoology at the University of California, was, with Mrs. Ritter, set at the head of a table at the Cosmos Club in Washington a few days ago, on the occasion of his seventieth birthday, while the members of Science Service staff, plus a few old-time friends, first fortified themselves with a festival dinner and then edified themselves with accounts and reminiscences of the life and works of their Chief.

Dr. Edwin E. Slosson, director of Science Service, acted as toastmaster, and called upon "charter members" of the biology group at the University of California who were present *in toto*, and also upon men whose association with Doctor Ritter has been more recent. An interesting feature of the evening was the reading of a series of tributes from Doctor Ritter's co-workers in the various enterprises in which he has been active. Prof. S. J. Holmes and Prof. C. A. Kofoid wrote concerning the foundation and development of the zoology department at the University of California; Dr. F. B. Summer about the Scripps Institution; President Hughes of Miami University about the institute for the study of population problems, and Dr. Edna Watson Bailey about the "Ritter Idea" nursery school in California. Dr. J. McKeen Cattell was present in person to speak of the development of Science Service, and Robert P. Scripps read a communication from H. L. Smithton which crowned the evening with an appreciation of the long friendship and cooperation between his father, E. W. Scripps, and Doctor Ritter.

The guests of the evening included Mr. and Mrs. Robert P. Scripps, Dr. and Mrs. T. S. Palmer, Dr. Vernon Kellogg, Dr. J. C. Merriam and Dr. J. McKeen Cattell, together with the entire personnel of Science Service staff and members of their immediate families.

Science News-Letter, December 4, 1926

Science News-Letter is Already Indexed

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. This follows the classification of the Library of Congress since this system has come into common use in the libraries of the country owing to the publication by the Government of the card index of all new books. We print below a list of the subject titles which will be most used in the SCIENCE NEWS-LETTER. "Outline Scheme of Classes," issued by the Library of Congress.

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GF Anthropogeography.
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GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
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M Music.
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P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering—General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trade.
TX Domestic science.
U Military science. General.
V Naval science. General.

Science News-Letter, December 4, 1926

The western world produces about 65 per cent of the silver in use.

Branches and tops of growing trees are often cut out for fuel in Belgium.

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ARCHÆOLOGY

Oldest Maya Ruin

The recent discovery of a Maya ruin dating back to the fourth century A. D. is the outstanding contribution to Maya archæology made in the past five years. This is the conclusion of Dr. Sylvanus G. Morley, archæologist of the Carnegie Institution of Washington.

Dr. Morley, who was in charge of the expeditions, stated that the new Maya ruin was once the ceremonial center of the great ruined city of Cobá, in Yucatan. This religious area consisted of a huge terrace spread over four acres, in which were three buildings and a number of mounds. The place is called Macanxoc, meaning in Maya, "It cannot be read."

"The remarkable feature of Macanxoc," Dr. Morley declared, "consists in the fact that there are eight large hieroglyphic monuments there recording dates from 354 to 413 A. D. These indicate that the Peninsula of Yucatan was discovered fully a century, or a century and a half, earlier than any previous accounts have indicated."

Further explorations in the region of Cobá may be expected to reveal other important cities of ancient America and shed a flood of light upon the early history of Yucatan, the speaker predicted.

Science News-Letter, December 4, 1926

PHYSICS

Measure Magnetism of Atom

The United States is forging ahead in the field of atomic physics where the brilliant theories of the Germans and Scandinavians have long held more or less undisputed sway. Experiments recently completed at Urbana, Ill., by Drs. J. B. Taylor and T. E. Phipps in the department of physical chemistry at the University of Illinois have produced results which throw a new angle on the quantum theory advanced by Dr. Neils Bohr, of Copenhagen, Nobel prize winner in physics, and that proposed by Drs. Max Born and W. Heisenberg of Goettengen.

Exponents of the German school have developed a theory that is based on a non-magnetic atom but the American scientists have found that the hydrogen atom is magnetic and have made a direct experimental determination of the degree of magnetism it possesses. They found that it was equal within the limits of experimental error, to one Bohr magneton, or unit of magnetic moment based on the Bohr quantum theory.

The atoms of the alkali elements such as sodium and potassium are known to behave as tiny magnets and since hydrogen is the simplest of all the chemical elements, knowledge of the degree of magnetism possessed by its atom is of great importance. All of the accepted theories of the continental school account for the spectrum of hydrogen accurately, in consequence of which a test of the nature of the hydrogen atom is of great scientific interest.

Science News-Letter, December 4, 1926

MEDICINE—CHEMISTRY

The Menace of CO

Gas attacks, colorless, odorless, deadly, occurring in these days of peace and industry are worrying those who care for the health of the nation.

CO, the chemical symbol for deadly carbon monoxide gas, is partaking a new significance, allied to the conventional skull and crossbones.

Carbon monoxide, the product of incomplete combustion, occurs in most dangerous concentration in garages and service stations, around blast furnaces, near gas fired appliances and wherever gas is burned or internal combustion engines are run. Dr. May R. Mayers of the Bureau of Industrial Hygiene of the New York State Department of Labor reported to the American Public Health Association that over three-fourths of the public garages inspected in New York City showed the presence of some carbon monoxide in their air, while over half of them had concentrations of over one tenth of one percent, the danger limit. Nearly three-fourths of the workers gave definite evidence of CO in the blood while some showed symptoms of being poisoned. Steam laundry workers at gas heated ironing machines were found to be affected and there is hardly any industrial activity in which carbon monoxide is not encountered in some concentration.

Lead poisoning, long an outstanding industrial menace, is now said to be second to the carbon monoxide danger. This gas is peculiarly insidious in its action since it may prove suddenly fatal even in minute concentrations without necessarily giving warning of its presence to those exposed. Dizziness, headaches, drowsiness, smarting of the eyes characterize its early symptoms but blindness, paralysis, and even insanity may follow exposure to the gas. A program of investigation to be followed by attempts at education and control, is planned for New York and elsewhere.

Science News-Letter, December 4, 1926

BIOLOGY

NATURE RAMBLINGS

By Frank Thone

Big and Little Evergreens

Now that the broad-leaved trees are stripped of their foliage, and stand under close-reefed bare poles against the storms of the winter, the evergreens again claim our attention. Among our native conifers probably none can compete with the fir, or balsam, for stateliness of form, for green thickness of foliage or for handsome symmetry of its cones.

Firs are to be distinguished from their nearest relatives, the spruces, partly by the character of their needles and partly by their cones. Spruce needles are square and stiff, and each one stands on a kind of little nib or stalk that projects from the twig. You get a decided pricking and scratching if you rub your hand through a spray of spruce. But the needles of the fir are flatter and softer and more flexible, so that the general effect is less "porcupiny." Moreover, they sit right on the twig, and have no basal stipes.

The cones of the fir are absolutely characteristic. They stand up erect, like thick brown candles, instead of hanging point-down. They are large, and their scales lie close, giving a smooth, even outline. Frequently the cones are beaded all over with the sticky resinous, odorous gum that gives the tree one of its names. And when at last they ripen they do not drop off entirely, but each scale comes loose (or is more frequently torn loose by the squirrels), leaving the central stalk or axis standing up empty and alone on the stem.

Winter does not necessarily mean an end of botanizing. Down on the forest floor, partly sheltered from the freezing and drying winds, there grows a whole flora of little hardy shrubs that keep their green leaves the winter through, and frequently render themselves even more attractive with bright berries.

Well to the fore among these brave plants is the wintergreen. It

(*Just turn the page*)

(*Continued from Page* 155)

belongs, as do many of the other members of this snow-time garden, to the same family as the much-praised European heather and the homelier American huckleberry. At first sight it would appear to be a tiny woody shrub a few inches high, but if you will brush aside the light snow and the dead leaves under it you will find that many of these little shrubs are attached to a long, rambling underground stem. The wintergreen is really a vine, therefore, though it sprawls on the ground instead of climbing a tree.

The pungent, aromatic oil in the leaves of the wintergreen has long been a favorite flavoring substance for candies, chewing-gum and other sweetmeats, as well as for disguising the taste of disagreeable medicine. Most of the wintergreen flavor on the market at present, however, is a synthetic product of the chemical factories. It is a compound of wood alcohol and salicylic acid, known technically as methyl salicylate.

Science News-Letter, December 4, 1926

Some spiders catch tadpoles.

Ice is regarded as a luxury in Cuba.

The mackerel has great muscular development.

Tobacco smoke is effective in destroying hibernating mosquitoes.

The fan bearer of an Egyptian pharaoh ranked as a high official.

Nickel, cobalt, and tungsten are used in making heat resisting alloys.

The lion's mane and ruff serve to protect its neck when it is attacked by enemies.

An oil suitable for lubricating airplane motors can be obtained from grape seed.

Many oils used in perfumery and flavors have antiseptic qualities from 10 to 20 times as strong as carbolic acid.

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First Glances at New Books

THEORETICAL BIOLOGY—J. von Uexhüll—Translated by D. L. MacKinnon—*Harcourt, Brace.* Interesting as evidence that the strong trend in present-day German philosophy away from materialism and mechanism is affecting German science also. Long known for his vitalistic predilections, in this book von Uexhüll undertakes to recast biological thought in a mould conformable to Kantian metaphysics. "In the world of the biologist there are only appearances, which react on one another through the medium of the subject." A particularly significant contention by the author is that the genes of modern genetics are the "super-mechanical factors" needed as a scientific basis for such a reconstructed biology.—*Wm. E. Ritter.*

Science News-Letter, December 4, 1926

CIVILIZATION OR CIVILIZATIONS—E. H. Goddard and P. A. Gibbons—*Boni and Liveright.* ($2.50). The mathematics of Einstein begat a vast literature of interpretation during the past decade; we may now expect the metaphysics of Spengler to do much the same sort of thing. This book will be very serviceable to those who lack either the time or the patience to wade through the massive, and frequently turbid, Spengler. It has the advantage for the English-reading student that it treats of both halves of Spengler's work, whereof only the first has thus far been put into English.

Science News-Letter, December 4, 1926

EXPERIMENTAL SCIENCE—*J. G.* Frewin—Part I—*Oxford University Press.* An experimental manual covering elementary physics, chemistry and physics of the air. It is of Scottish origin and seems to be so delightfully simple and practical that students might be interested.

Science News-Letter, December 4, 1926

FLATLAND—A Square—(Rev. Edwin A. Abbott)—*Little, Brown.* ($1.50). This is a new edition of the classic and "romance of many dimensions" of forty years ago. Satire, fiction, geometry and what have you.

Science News-Letter, December 4, 1926

BEHAVIORISM—John B. Watson—*Norton.* ($3). The faith and works of John B. Watson set down in succinct and mainly non-technical language. Appropriately, a considerable part of the discussion consists of concise descriptions of experiments.

Science News-Letter, December 4, 1926

SCIENCE AND LIFE—Frederick Soddy—*Dutton.* ($4). Professor Soddy is decidedly different from most professors of chemistry. He is concerned also with the sociological influences and theological implications of his science. He is rather radical in his views and quite critical and refreshingly frank. As a Nobel prizeman he speaks with authority in the chapters on radium, and the constitution of matter, and his *obiter dicta* on education, labor, war, civil service and the Carnegie trust will be read with respectful interest. This is a new edition of his Aberdeen Addresses first published in 1920, but the book needs revision to cut out the local and temporal matter from the part of permanent and general interest.

Science News-Letter, December 4, 1926

AMATEUR TELESCOPE MAKING—Edited by Albert G. Ingalls—*Scientific American Publishing Co.* ($2). Clear, concise and complete directions to the layman for making a reflecting telescope that will not only permit him to see the glories of the heavens but to do work of scientific value.

Science News-Letter, December 4, 1926

THE BIOLOGY OF THE PROTOZTA—Gary N. Calkins—*Lea & Febiger.* ($7.50). Condensed but complete, doing justice to the physiology of the protozta as well as to their taxonomy and morphology, rich with accurate illustrations, this book is immediately recognizable as a classic and a necessity for even the smallest working library in zoology or hygiene.

Science News-Letter, December 4, 1926

A MAGICIAN OF SCIENCE, The Boys' Life of Steinmetz—John Winthrop Hammond—*Century.* ($1.75). The biography of the great Lightning-Maker adapted into a book for boys.

Science News-Letter, December 4, 1926

MEASUREMENT OF INTELLIGENCE BY DRAWINGS—Florence L. Goodenough—*World Book Company.* ($1.80). "Draw a man" was the task set young children by this psychologist, and after studying 4,000 human portraits she has evolved a quick method of rating intelligence of children from four to ten years old by this test.

Science News-Letter, December 4, 1926

PROBLEMS OF HUMAN REPRODUCTION—Paul Popenoe—*William & Wilkins.* ($2.50). Contains within its 200 pages an amazingly wide range of information on the scientific principles involved, expressed in clear but not colloquial language and including the most recent discoveries.

Science News-Letter, December 4, 1926

An Unsolved Cipher

The cipher, or cryptogram, has been used almost since the discovery of writing to convey information secretly to the initiated who hold the clue, and the decipherment of such messages has been a fascinating pastime for puzzle lovers for the same length of time. The cipher is constructed by substituting one letter of the alphabet for another consistently throughout the message. The decipherment is usually accomplished by such hints as the relative frequency of occurrence of the commoner consonants and, especially, of the vowels.

The following historic cryptogram was composed by Sir Christopher Wrenn and presented to the Royal Society when Sir Christopher was over eighty years old. It describes three instruments proper for discovering longitude at sea—a pressing nautical problem in his daq. It is presumed that each of the paragraphs of letters is the description of a separate instrument, nothing more is known of its meaning. Sir Christopher died before he revealed its secret, and no solution of it has been published, so far as is known. It may possibly be in Latin. But experts in the art claim that no cryptogram can be constructed which cannot be solved. Are present-day scientists more astute than were their eighteenth century colleagues?

SIR CHRISTOPHER WRENN'S CIPHER

O Z V C V A Y I N I X D N C
V O C W E D C N M A L N A B
E C I R T E W N G R A M H H C
C A W.

Z E I Y E I N O I E B I V T X
E S C I O C P S D E D M N A
N H S E F P R P I W H D R
A E H H X C I F.

E Z K A V E B I M O X R F C
S L C E E D H W M G N N I
V E O M R E W W E R R C S H
E P C I P.

Science News-Letter, December 4, 1926

Platypaleontology

The Ornithorhynchus went over the hill
To view the remains of a Pterodactyl;
"A queer bird was Pterry,
"A funny one, very!"
Said the Ornithorhynchus, a-scratching his bill.

—*Anonymous.*

Science News-Letter, December 4, 1926

The common housefly is a hairy creature, with sticky pads on its feet.

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Anniversaries of Science

December 13, 1889.—The last of Hertz's researches on the relation between light and electric waves was presented before the Berlin Academy of Sciences.

It is light, just as good as any other light. It travels at the same pace, it is reflected and refracted according to the same laws; every experiment known to optics can be performed with this aetherial radiation electrically produced, and yet you cannot see it. Why not? For no fault of the light, the fault (if there be a fault), is in the eye. . . . . These electro-magnetic waves have long been known on the side of theory, but interest in them has been immensely quickened by the discovery of a receiver or detector for them. The great though simple discovery by Hertz of an "electric eye," as Sir W. Thompson calls it, makes experiments on these waves for the first time easy or even possible. We have now a sort of artificial sense organ for their appreciation,—an electric arrangement which can virtually "see" these intermediate rates of vibration.

—Sir Oliver Lodge: *The Modern Theory of Light* in University College Magazine, July, 1889.

December 14, 1911.—Amundsen reached the South Pole.

December 14 dawned. It seemed to me as if we slept a shorter time, as if we ate breakfast in greater haste, and as if we started earlier on this morning than on the preceding days. As heretofore, we had clear weather, beautiful sunshine, and only a very light breeze. We advanced well. Not much was said. I think that each one of us was occupied with his own thoughts. Probably only one thought dominated us all, a thought which caused us to look eagerly toward the south and to scan the horizon of this unlimited plateau. Were we the first or ——?

The distance calculated was covered. Our goal had been reached. Quietly, in absolute silence, the mighty plateau lay stretched out before us. No man had ever yet seen it, no man had ever yet stood on it. In no direction was a sign to be seen. It was indeed a solemn moment when, each of us grasping the flagpole with one hand, we all hoisted the flag of our country on the geographical South Pole, on "King Haakon VII Plateau."

—Amundsen: *Expedition to the South Pole* in Bulletin of the American Geographical Society, November, 1912.

December 15, 1920.—The Bureau of Standards broadcast the first weather and crop reports of the Department of Agriculture.

Through the cooperation of the United States Bureau of Standards the Bureau of Markets recently made arrangements for sending "Daily Radio Marketgrams" from the Washington radio station of the Bureau of Standards. . . . The "Daily Radio Marketgrams" are wirelessed at 5 p. m. each business day, and are received by hundreds of amateur wireless operators within a 200-mile radius of Washington. These operators relay the information to farmers, farmers' organizations, shippers' organizations, newspapers, and others concerned with the marketing of farm products. Certain newspapers have installed wireless equipment to receive the reports direct and other newspapers are making similar arrangements. . . . In conducting the experiment the Bureau of Markets has the benefit of the experience and advice of some of the Nation's foremost wireless experts, and marketing agencies everywhere are watching the work with great interest.

—*Yearbook of the Department of Agriculture*, 1920.

December 15, 1859.—Gustav Kirchhoff communicated to the Berlin Academy of Sciences the principle that glowing vapors absorb the same radiations that they emit, thus accounting for Fraunhofer lines in the solar spectrum.

The Spectroscope was turned to the sun and some of the innumerable dark lines in its spectrum were mapped by Fraunhofer. But it was not until 1859 that Kirchhoff and Bunsen found the key to these lines; they showed that most of them are caused by absorption in the very shallow and comparatively cool atmosphere of the sun. Each element has its characteristic lines which appear wherever the absorption takes place, whether in the laboratory, in the sun, or elsewhere. Here then is a means of analyzing the sun in the chemist's sense. It is found that almost all common elements that we find at the surface of the earth are also plentiful in the sun.

—Frank Schlesinger: *Astronomy* in The Development of the Sciences.

Science News-Letter, December 4, 1926

Milton is Noncommital

Whether the sun predominant in Heaven
Rise on the earth, or earth rise on the sun;
He from the east his flaming road begin,
Or she from west her silent course advance
With inoffensive pace that spinning sleeps
On her soft axle, while she paces even,
And bears thee soft with the smooth air along;
Solicit not thy thoughts with matters hid;
Leave them to God above, Him serve and fear.

—Milton: *Paradise Lost, viii.* (1667)

Science News-Letter, December 4, 1926

The little elephant shrew has features of the elephant, rat, and kangaroo.

The only difference between the radio waves that make music audible a thousand miles away, and light rays that make the stars visible from a distance of billions of miles, is the length and frequency of the waves.

Darwin's Accuracy

Quotation from DARWIN.—Gamaliel Bradford.—*Houghton Mifflin.*

The fundamental principle of all scientific observation is accuracy, and no one knew this better than Darwin. No one understood better than he the subtle, treacherous influences that are always at work, distracting, impairing, and distorting exact and lucid vision. There is the danger of seeing what we are accustomed to see and therefore think we see. There is the danger of seeing what others have seen and described before us. There is the supreme danger of seeing what we wish to see, what accords with some preconceived theory or dogma. Against all these dangers Darwin tried to be ever on his guard, and he is constantly warning others of them and emphasizing the importance of pure accuracy and the enormous difficulty of it. "Good heavens, how difficult accuracy is!" Among all the merits of the scientist he values accuracy highest, and instinct and the ability to record facts correctly: "I value praise for accurate observation far higher than for any other quality." And especially in one admirable passage he stresses and reiterates both the difficulty and the value: "Accuracy is the soul of Natural History. It is hard to become accurate; he who modifies a hair's breadth will never become accurate . . . Absolute accuracy is the hardest merit to attain, and the highest merit." . . . One cannot be too careful, too scrupulous, about one's statements, or too anxious to correct them, when one has made a mistake. And Darwin gets up in the middle of the night and arouses a slumbering friend to explain that, after all he felt the sense of the sublime more fully in the forests of Brazil than on the top of the Cordilleras.

Science News-Letter, December 4, 1926

ENTOMOLOGY

Trap Takes Bug Census

Screened boxes of sticky fly paper help United States Bureau of Entomology experts tell how many bugs are parked on a fruit tree.

Counting the individual insects that constitute crop pests give entomologists valuable data on the degree of infestation in different orchards and the time of the year when the pest is most numerous. The box is held under the branches with one hand while they are shaken against it with the other. When a tree is finished the lid of the box is closed and the insects are counted in the laboratory.

Science News-Letter, December 4, 1926

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